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ABSTRACT

To consolidate the diversity of opinion about the definition of competency, an operational definition and skills classification matrix is presented. Although most people agree that competency tests should measure student ability to transfer academic training to life situations, the fact that life skills and school skills represent different domains creates semantic problems. Competency can be defined as the ability to use a specific skill or set of skills to meet the needs of a specific situation. The dimensions suggested here--enabling skills, and context in which they are applied--provide a two-dimensional matrix. Matrix rows can identify skills which may be classified as content areas (reading, mathematics); columns can identify application of these skills to academic performance, job requirements, or everyday situations. Skills and context can also be classified narrowly to analyze definitions of competency or items on existing tests. Use of the matrix avoids the need to decide whether competency tests, in general, measure school-developed skills or life-related abilities. After defining context and describing skills, the final step of competency evaluation is deciding how skills should be measured (tests, observation, product evaluation, etc.), and how much is enough. (CP)

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A TAXONOMY FOR COMPETENCY PROGRAMS

Paper Presented at the AERA Minimum Competency Testing Conference

October, 1978

by F. L. Finch - CTB/McGraw-Hill

Tests of everyday skills were originally developed with the modest expectation that they would provide relevant measures of literacy and mathematics competency. They were designed to evaluate the results of schooling in a way that would indicate whether a student could transfer academic training to life-role situations. As such, they were immediately embraced by parents and students, who perceived them as providing a highly relevant method of evaluating performance and a literacy criterion that was more readily understood than a grade-equivalent score.

During recent years, a media blitz and several lawsuits asserting that schools have failed to meet the needs of students have focused an intolerable level of attention on the failure of diplomas to serve as symbols of excellent or even average performance. Some schools have turned to everyday skills tests for an answer to the problem. In addition, many state legislatures have forced the schools to take action. In most cases, this action has been to propose minimum competency testing. However, the results of such testing have tended to exacerbate already inflamed emotions because the critics' worst fears seem to have been confirmed. Is it possible that so many have learned so little?

Or, is this even the right question? Perhaps the questions we should be considering have been suggested by Jean Chall (1978) who asks:

> "Was John Doe a functional illiterate after 12 years of schooling because the achievement tests he took in school failed to reveal his reading problem? Or did his severe reading problem suffer from failure on the part of school personnel to implement the test findings? If so, might not the same occur with the best of the state competency tests [p. 5]?"

A fanatic has been defined as one who, having lost sight of his goal, redoubles his efforts. Spady (1977) characterizes adherents and practitioners of Competency Based Education (CBE) as "marching (or parading) in different uniforms, to different drummers, playing different tunes [9]." In responding to Spady's call for "basic definitions, conceptual clarity, and analysis of the organizational and social implications of various CBE approches [9]," many educators have suggested that the fundamental issues include a need to develop a universally acceptable definition of competency, a best method for testing competency, and a proper criterion for distinguishing between competent and incompetent individuals. In response to these needs, hosts of educational philosphers and statisticians have come charging to the rescue, each offering his or her version of universal truth. The attendant verbal melee has been awful to behold and almost impossible to comprehend.

It could be useful now, or at least palliative, to acknowledge that there may be no single best definition for competency, no best way of measuring competency, no ultimate criterion for competency, and no simple way of solving

the literacy problem. As Sitton (1978) sagely suggests, opposition to competency testing and confusion regarding the meaning and purpose of competency measurement stems from the fact that we have failed to recognize that "the real issue is disagreement over the basic purpose of public education among educationists, teachers, students, and parents." Sitton points out that it is not reasonable to expect unanimous agreement regarding the nature and purpose of competency testing when individuals or groups expect schools to serve a multitude of functions. For instance, the school has been perceived by different groups as:

- a college preparation academy
- a basic education service
- a job training institute
- a nonevaluative, credential-granting institution
- a socializing or behavior modification clinic
- a sports and social club
- a baby-sitting service

It may be supposed that the competency movement is fueled by the rhetoric of back-to-basics advocates who assert that a small but unacceptable number of students have endured twelve or more years of schooling without developing sufficient skill (whatever that means) in reading, writing, and mathematics. However, others join Jencks (1978) in opposing the competency movement because it seems to ignore "other necessary skills, such as learning to think critically and dealing with complex ideas [p. 52]."

Before a positive direction can be established, the diverse views of what constitutes "competency" must be accommodated by a theoretical framework that provides a method for describing a variety of abilities. There is no reason

to restrict definitions of competency to basic skills or even "life skills" when when some educational programs may be interested in oral competency, social competency, and the like. The diversity of needs and opinions makes it essential to operationally describe competency in a way that allows rational discussion. Information to support this point of view is provided by Chall's survey (1978), which found that 80 percent of the states were planning, developing, or giving competency tests, but that only 23 percent of the chief state school officers knew how to define and measure competency. The survey further identified 30 percent who said that they could define competency, but had not yet decided how to measure it, and 40 percent who were working on definitions and procedures.

Out of the considerable debate about the nature of competency, there appears to be a consensus (although not a unanimous opinion) that competency tests should measure a student's ability to transfer academic training to life-role situations. An excellent article by Brickell (1978) provides a cogent analysis of many of the major issues. However, his implication that life skills and school skills represent two different domains creates a problem. It is not reasonable to expect schools to prepare students "for the shopping center [p. 589]" by teaching to the kind of "life skills" items represented by the following example provided by Brickell:

> "To saw very hard metal, should you buy a hacksaw blade with few teeth or many teeth [p. 589]"?

This item is an excellent example of some of the attempts that have been made to separate "school skills" and "life-role" skills. The competency being tested

by this item may be an important one for plumbers and hardware salespersons, but it would have little general application. While it might be desirable to teach such specific solutions to all of the problems that an individual can encounter, it is obviously impossible to do so. The most that we can expect of schools is that they provide a basic foundation of skills that can be applied to a wide variety of situations.

The competency movement, like any new phenomenon, is plagued with problems of semantics. Practitioners of competency education and evaluation are using a fairly small core vocabulary to describe a wide variety of situations. Therefore, communication is hampered by the false assumption that similar terms have similar meanings. For example, the term "competency test" is frequently used to identify a paper-and-pencil test that includes questions about situations a person might encounter in the "real world." In contrast, some educators insist that competency tests that are used as a graduation requirement should measure "school skills." This problem could be partially solved if everyone agreed to use a descriptive adjective along with the word "competency." A Life-Role Competency Test could identify a measure of ability to function in a non-school environment, and could be defined as a measure of application of skills, learned in school or elsewhere, to simulations of situations that occur in life. Another kind of competency test might be designated a "Job Skills Competency Test" or a "Basic Academic Skills Competency Test."

While descriptive labels can greatly improve accuracy of communication, it is essential to develop methods of operationally describing the content of competency tests. As a starting point, we might define competency as "the ability to use a specific skill or set of skills to meet the needs of a specific situation." Note that this definition suggests that a competency has two aspects: the enabling

skills, and the context in which these skills are applied. Table 1 shows how these two components can provide a framework for describing competency tests.

INSERT TABLE 1 HERE

Each item in a competency test can be described in terms of its position with relation to its context, which is based on a specific definition of competency, and the enabling skills that allow the individual to meet the performance requirements of a specific situation. This approach obviates the need to decide whether competency tests, as a general class, measure school-developed skills or life-related abilities. In fact, many CBE practitioners may choose to describe the enabling skills dimension in terms of basic skills such as addition, subtraction, literal comprehension, and the like. Alternatively, enabling skills could be described in terms of cognitive taxonomies, such as those developed by Bloom (1956), Metfessel et. al. (1969), or Nelson (1978). It is inappropriate to suggest a single best method of classifying the enabling skills aspect of competency. However, if enabling skills are based on instructional classifications, reporting the sums of both rows and columns of a single test would provide information about life-role competencies and basic skills achievement. Such information might prove useful in responding to legal challenges that "competencies" have not been taught in school.

As the rows identify skills, the columns of Table 1 can be used to describe the various contexts of competency measurement. These contexts may be so specific as to identify particular life-role applications, such as income tax forms, business letters, want ads, and other content associated with a single competency test. Alternatively, the context columns can be used to describe

TABLE 1
SKILL AND CONTEXT MATRIX

ENABLING SKILLS	COMPETENCY CONTEXT				
	1	2	3	4	ETC
1	ITEM 1			ITEM 2	
2			ITEM 3		
3	ITEM 4				
ETC					

broad classifications of competency for the purpose of classifying the many varieties of competency tests. Table 2 provides an example of the latter.

INSERT TABLE 2 HERE

Competency testing, as currently practiced, seems to emphasize everyday applications without reference to the enabling skills associated with the measurement context. The result is that some competency measures can not be adequately described, and students are often expected to meet a minimum standard based on an unclassified (and often unclassifiable) assortment of items for which there is no specified rationale. The use of a two-dimensional matrix allows the educational planner to understand the implications of a specific definition of competency and to develop a test that adequately measures the competencies subsumed by the definition. Such a matrix can also be used for ex post facto analysis of existing measures or definitions. An example of such an analysis is provided by Table 3, which shows classification of sample minimum competency items presented by Findley (1978).

INSERT TABLE 3 HERE

The context and skill classifications shown in Table 3 might not be the ones that the authors of this test would have used, but they describe this set of items fairly well. It is apparent that at least two consumerism items (1 and 4A) require specific information that must be directly learned from expository teaching or reading, and that at least two items (2 and 4D) can be answered by using logical reasoning, or common sense. Two of the five consumerism items (3 and 5) require application of several mathematics skills

TABLE 2
GENERAL CLASSES OF COMPETENCY MEASURES

ENABLING SKILLS	COMPETENCY CONTEXTS			
	SCHOOL AND COLLEGE PERFORMANCE (BY COURSE)	EVERYDAY APPLICATIONS (BY SITUATION)	GENERAL WORK SKILLS (BY TASK) OR SPECIFIC CAREER REQUIREMENTS (FROM JOB ANALYSES)	ETC
READING				
WRITING				
MATHEMATICS				
INFORMATION				
ETC				

TABLE 3
SAMPLE MINIMUM COMPETENCY QUESTIONS

ENABLING SKILLS	COMPETENCY CONTEXTS					
	CONSUMERISM ITEMS				MATHEMATICS ITEMS	
	GROUP HEALTH INSURANCE	CREDIT AND BANKING	CONSUMER PROTECTION AGENCIES	PURCHASING	PURCHASING	MATH SCHOOL SKILLS
SPECIFIC INFORMATION	1		4A, 4B, 4C7			
LOGICAL REASONING		2	4C7, 4D			
ADDITION						2
SUBTRACTION		3				
MULTIPLICATION		3			3	3, 4
DIVISION				5		
PLACE VALUE						1
MATH CONVERSIONS						4, 5
IDENTIFY MATH PROCESS		3		5		

to reach a solution. The skills associated with item 5 in the consumerism test and item 3 in the mathematics test differ only in the mathematical operation used (multiplication vs. division) and in the units of measure. A closer look at these two items confirms the similarity between calculating the price-per-ounce of cola and the price-per-foot of chain link fencing, and suggests that the items do not represent two different classes of competency. One item asks for the lowest price-per-ounce of cola and the other asks the appropximate cost for 50 feet of fencing. However, the specific wording of the items changes neither the context of the purchasing behavior nor the requirement for application of specific computational skills. Although these items could be classified in a variety of ways, it would be a minor error to assert that that there is an important difference in the competency that they measure, and a grievous error to argue that one is a school-skill and the other a life-skill requirement.

While the context and skills competency matrix may be used to analyze existing competency tests, it is most useful when used in the planning stages of test development to specify content to be measured. In order to adequately evaluate performance in life-role situations, competency test developers should first describe the contexts, or situations, that apply to their definition of competency, and then analyze each context to identify the skills that enable the individual to make an appropriate response. This procedure will result in a description of skills to be measured which, when compared to the school curriculum, will usually show that some basic academic skills are overrepresented, some are underrepresented, and some are omitted because they do not pertain to the applied situations selected. For example, possible items associated with balancing a checkbook would be limited to the skills required to perform this task. If, on the other hand, the competency evaluators desire to determine

whether students can transfer basic skills training to life-role situations, the important basic skills would first be listed and non-school situations that require application of these skills would be selected. The latter procedure would result in a test that samples a broader range of skills than competency tests for which ubiquity has been used as the primary criterion for including a skill or life-role application.

In terms of the proposed taxonomy, then, enabling skills may be classified in various ways, ranging from school skill descriptions to cognitive processes. Competency contexts may be based on broad classifications or on descriptions of specific applications. Whatever system of classification is used, it is essential that the CBE practitioner develop and use a competency framework that provides an operational definition consistent with the philosophy of the program.

In addition to enabling skills and competency contexts, one other parameter must be considered in describing competency measurement. Fitzpatrick and Morrison (1971) have discussed the importance of "fidelity of simulation [p. 239]" in performance tests. Brickell (1978) has also discussed this issue, and Kasun (1978) has succinctly summarized the lack of congruence between theory and application: "Just how different the real world is from classroom descriptions of it is a lesson that eventually comes to most of us, usually with a degree of shock [p. 17]." Life-role competency tests and appropriate remediation for demonstrated deficiencies can minimize this shock only if the competency measure provides a reasonable simulation of the desired behavior.

We frequently hear assertions of the magnitude of prevailing literacy rates (e.g., a recent article in U. S. News and World Report claimed that "13% of all 17 year-olds are functionally illiterate"), but such statements are meaningless unless they are based on an operational definition of literacy. Descriptions of the skills and contexts measured can help to give meaning to such statements, but

the operational definition is not complete until we know how competency has been measured and what criterion performance levels have been established.

For convenience, the term "test" has been used in this discussion, but it should not be assumed that multiple-choice and paper-and-pencil tests can or should be used as the sole measure of competency. Figure 1 shows only a few of the possible measures that could be related to the proposed model.

INSERT FIGURE 1 HERE

If it were possible to illustrate a fourth dimension on the model, the criterion for acceptable performance might be plotted. However, since the criterion is so closely related to the type of measure used, it is appropriate not to distinguish them. Figure 1 suggests a few of the descriptors that may be used to describe competency. The actual terms used may not be important, as long as the CBE practitioner is able to define competency in terms of these three components. Figure 2 illustrates the general case.

INSERT FIGURE 2 HERE

These three dimensions identify the information required to produce an operational definition of competency. They can be used as a starting point in the development of a competency framework or for an ex post facto analysis of an existing program, test, or philosopy. Either use requires the following steps:

- Define the context: Competent to do what?
- Describe the skills: What enabling skills are required?
- Set the standards: How are they measured and how much is enough?

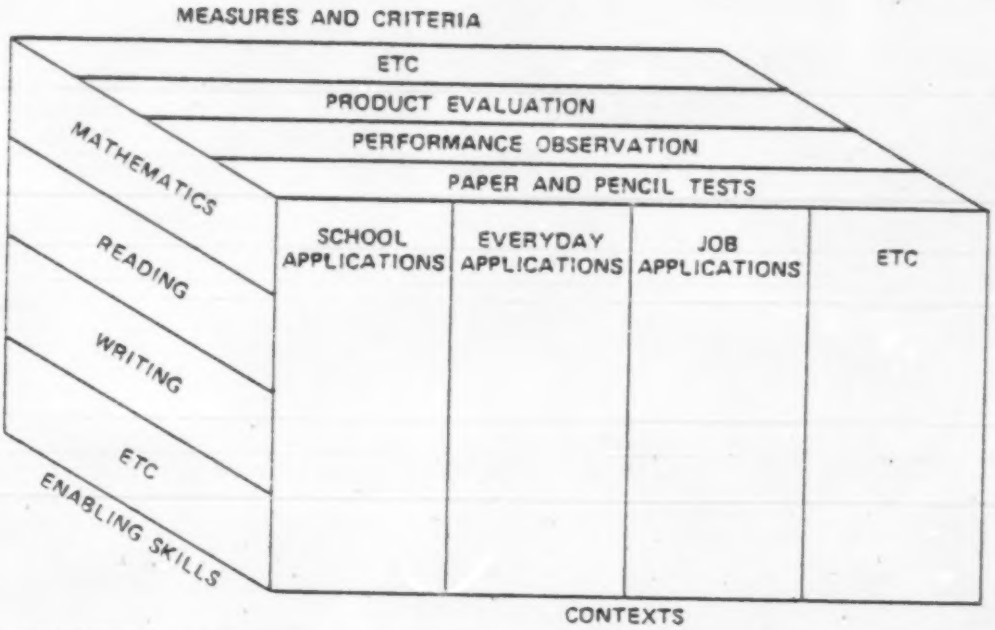

FIGURE 1. COMPETENCY DIMENSIONS

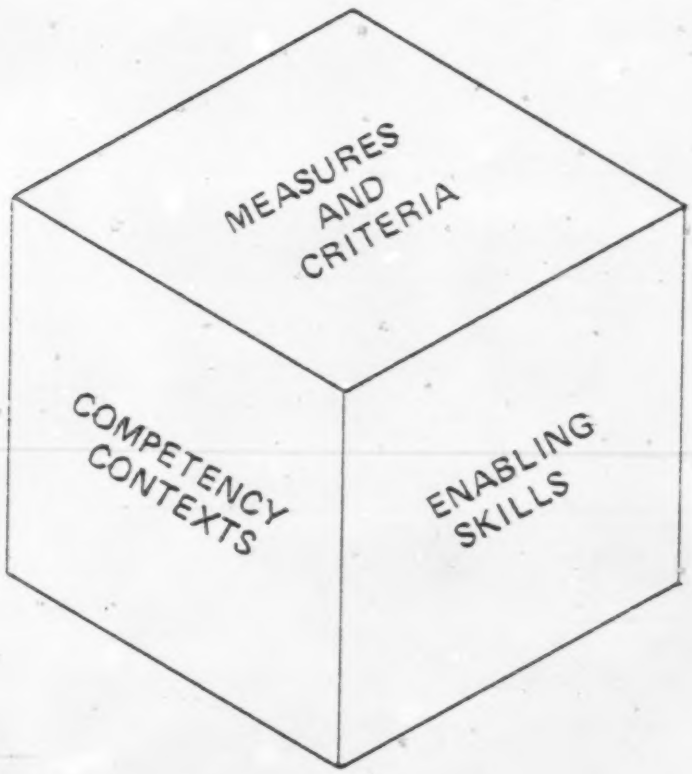

FIGURE 2. THE 3 FACES OF COMPETENCY EVALUATION

Debating whether or not basic academic skills are more important than life-role applications, or even trying to determine which represent "higher level" skills, may be futile -- or may be only of academic interest. Even so, unlike the chicken or egg problem, it seems obvious which comes first. The problems of day-to-day living are solved by the application of basic skills. The manner in which these skills are measured may vary, but the test developer and the test user must develop a reasonable method of describing the skills which are measured and the problems to which they are applied.

Because of the new emphasis on life-role skills, teachers need no longer be restricted to teaching abstract academic skills, and students need no longer wait for graduation to begin a trial-and-error course of study in the application of classroom learning to everyday situations. In order to prepare students for tests of applied skills, the practical realities of daily life have been brought into the classroom.

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